CLAIMS:

1. A method of causing a first material to react with a second material, comprising:

placing a first material in close proximity to a second material; and

delivering a laser beam to a plurality of selectable locations on said second material thereby to induce a reaction between said first material and said second material at said selectable locations.

2. The method claimed in claim 1, wherein said placing a first material in close proximity to a second material comprises immersing a solid material in a gas.

3. The method claimed in claim 2, wherein said immersing comprises immersing a substrate comprising silicon, in a gas comprising a dopant.

4. The method claimed in claim 3, wherein said silicon is deposited as a film on an insulating substrate.

5. The method claimed in claim 3, wherein said locations correspond to locations whereat transistors are to be formed in said silicon.

6. The method claimed in claim 1, wherein said placing a first material in close proximity to a second material comprises showering ionized molecules onto a solid material.

7. The method claimed in claim 6, wherein said solid material comprises silicon and said ionized molecules comprise a dopant.

8. The method claimed in claim 7, wherein said silicon is deposited on an insulating substrate.

9. The method claimed in claim 8, wherein said locations correspond to locations whereat transistors are to be formed in said silicon.

10. The method claimed in claim 1, wherein said placing the first material in close proximity to the second material comprises placing a first solid material in contact with a second solid material.

11. The method claimed in claim 10, wherein one of said solid materials comprises at least one of a dopant and an etching agent.

12. The method claimed in claim 10, wherein one of said solid materials comprises an etching agent.

13. The method claimed in claim 1, wherein said placing said first material in close proximity to said second material comprises placing a solid material in contact with a liquid.

14. The method claimed in claim 13, wherein said liquid comprises at least one of a dopant and an etching agent.

15. The method claimed in claim 13, wherein said liquid comprises an etching agent.

16. The method claimed in claim 1, wherein said delivering a laser beam comprises splitting a first laser beam into a plurality of sub-beams, and delivering said sub-beams to said selectable locations.

17. The method claimed in claim 1, wherein said delivering a laser beam comprises scanning a pulsed laser beam across a surface, and synchronizing said scanning with pulses defining said pulsed laser beam to deliver at least one pulse to each said selectable locations.

18. The method claimed in claim 17, wherein said delivering a laser beam further comprises modulating said laser beam to deliver said pulses exclusively to said selected locations.

19. The method claimed in claim 1, wherein said delivering a laser beam comprises delivering said laser beam to said selectable locations that are at least partially isolated from each other.

20. The method claimed in claim 1, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from each other in size.

21. The method claimed in claim 1, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from other said selectable locations in spacing.

22. The method claimed in claim 1, wherein said delivering a laser beam comprises modulating an energy characteristic of said laser beam.

23. The method claimed in claim 22, wherein said delivering a laser beam comprises delivering said laser beam with a first modulated energy characteristic to a first independently selectable location, and then delivering said laser beam with a second modulated energy characteristic to a second independently selectable location.

24. The method claimed in claim 1, wherein said delivering a laser beam comprises delivering a pulsed laser beam having a pulse repetition rate of greater than 5 KHz.

25. The method claimed in claim 1, further comprising individually heating each of said selectable locations to at least partially melt said second material.

26. The method claimed in claim 1, wherein said delivering a laser beam comprises selecting locations during operation of a laser supplying said laser beam.

27. The method claimed in claim 26, wherein said selecting comprises steering said laser beam to said selectable locations.

28. The method claimed in claim 26, wherein said selecting comprises scanning said laser beam and modulating the beam during scanning.

29. The method claimed in claim 1 and wherein said selectable locations are selectable during a reaction induction operation performed on said second material.

30. The method claimed in claim 29 and wherein said selectable locations are selectable independently of selecting other selectable locations.

31. The method claimed in claim 1, wherein said delivering a laser beam comprises delivering said laser beam to independently selectable locations without an intervening photo mask.

32. The method claimed in claim 31, wherein said delivering a laser beam comprises selecting locations during operation of a laser supplying said laser beam.

33. A method of doping semiconductors, comprising:

immersing a substrate in a dopant; and

delivering a laser beam to a plurality of selectable locations on said substrate thereby to induce a reaction between said dopant and said substrate at said selectable locations.

34. The method claimed in claim 33, wherein said substrate comprises a semiconductor material.

35. The method claimed in claim 33, wherein said semiconductor material comprises silicon.

36. The method claimed in claim 35, wherein said silicon is deposited as a film on an insulating substrate.

37. The method claimed in claim 36, wherein said film comprises a plurality of non-contiguous formations.

38. The method claimed in claim 35, wherein said plurality of selectable locations correspond to locations whereat transistors are to be formed in said silicon.

39. The method claimed in claim 33, wherein said immersing a semiconductor comprises showering ionized molecules onto a solid material.

40. The method claimed in claim 33, wherein said delivering a laser beam comprises splitting a first laser beam into a plurality of sub-beams, and delivering said sub-beams to mutually independently selectable locations.

41. The method claimed in claim 33, wherein said delivering a laser beam comprises scanning a pulsed laser beam across a surface of said substrate, and synchronizing said scanning with pulses defining said pulsed laser beam to deliver at least one pulse to a selectable location.

42. The method claimed in claim 41, wherein said delivering a laser beam further comprises modulating said laser beam to deliver said pulses exclusively to said selected locations.

43. The method claimed in claim 33, wherein said delivering a laser beam comprises delivering said laser beam to said selectable locations that are at least partially isolated from other said selectable locations.

44. The method claimed in claim 33, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from other said selectable locations in size.

45. The method claimed in claim 33, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from other said selectable locations in spacing.

46. The method claimed in claim 33, wherein said delivering a laser beam comprises modulating an energy characteristic of said laser beam.

47. The method claimed in claim 46, wherein said delivering a laser beam comprises delivering said laser beam with a first modulated energy characteristic to a first independently selectable location, and then delivering said laser beam with a second modulated energy characteristic to a second independently selectable location.

48. The method claimed in claim 33, wherein said delivering a laser beam comprises delivering a pulsed laser beam having a pulse repetition rate of greater than 5 KHz.

49. The method claimed in claim 33, further comprising individually heating each of said selectable locations to at least partially melt said second material.

50. The method claimed in claim 33, wherein said delivering a laser beam comprises selecting locations during operation of a laser supplying said laser beam.

51. The method claimed in claim 50, wherein said selecting comprises steering said laser beam to said selectable locations.

52. The method claimed in claim 50, wherein said selecting comprises scanning said laser beam and modulating said beam during scanning.

53. The method claimed in claim 33, wherein said delivering a laser beam comprises delivering said laser beam to independently selectable locations without an intervening photo mask.

54. The method claimed in claim 53, wherein said delivering a laser beam comprises selecting locations during operation of a laser supplying said laser beam.

55. The method claimed in claim 33 and wherein said selectable locations are selectable during a reaction induction operation performed on said substrate.

56. A method of fabricating thin film transistors, comprising:

forming at least one conductive film on a substrate;

immersing said substrate in a dopant; and

delivering a laser beam to a plurality of independently selectable locations on said substrate to induce a reaction between said dopant and said conductive film at said independently selectable locations.

57. The method claimed in claim 56, wherein said conductive film comprises a semiconductor film..

58. The method claimed in claim 56, wherein said conductive film comprises silicon.

59. The method claimed in claim 58, wherein said conductive film is deposited on an insulating substrate.

60. The method claimed in claim 59 and wherein said insulating substrate comprises glass.

61. The method claimed in claim 56, wherein said locations correspond to locations whereat transistors are to be formed in said conductive film.

62. The method claimed in claim 56, wherein said immersing said substrate comprises showering ionized molecules onto said substrate.

63. The method claimed in claim 56, wherein said delivering a laser beam comprises splitting a first laser beam into a plurality of sub-beams, and delivering said sub-beams to mutually independently selectable locations.

64. The method claimed in claim 56, wherein said delivering a laser beam comprises scanning a pulsed laser beam across a surface, and synchronizing said scanning with pulses defining said pulsed laser beam to deliver at least one pulse to a selectable location.

65. The method claimed in claim 64, wherein said delivering a laser beam further comprises modulating said laser beam to deliver said pulses exclusively to said selected locations.

66. The method claimed in claim 56, wherein said delivering a laser beam comprises delivering said laser beam to said selectable locations that are at least partially isolated from other said selectable locations.

67. The method claimed in claim 56, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from other said selectable locations in size.

68. The method claimed in claim 56, wherein said delivering comprises delivering said laser beam to said selectable locations that vary from other said selectable locations in spacing.

69. The method claimed in claim 56, wherein said delivering a laser beam comprises modulating an energy characteristic of said laser beam.

70. The method claimed in claim 69, wherein said delivering a laser beam comprises delivering said laser beam with a first modulated energy characteristic to a first independently selectable location, and then delivering said laser beam with a second modulated energy characteristic to a second independently selectable location.

71. The method claimed in claim 56, wherein said delivering a laser beam comprises delivering a pulsed laser beam having a pulse repetition rate of greater than 5 KHz.

72. The method claimed in claim 56, further comprising individually heating each of said selectable locations to at least partially melt said conductive film thereat.

73. The method claimed in claim 56, wherein said delivering a laser beam comprises selecting locations during operation of a laser supplying said laser beam.

74. The method claimed in claim 56, wherein said delivering a laser beam comprises selecting locations during performing a reaction induction operation on said conductive film.

75. The method claimed in claim 73, wherein said selecting comprises steering said laser beam to said selectable locations.

76. The method claimed in claim 73, wherein said selecting comprises scanning said laser beam and modulating the beam during scanning.

77. The method claimed in claim 56, wherein said delivering a laser beam comprises delivering said laser beam to said independently selectable locations without an intervening photo mask.

78. The method claimed in claim 77, wherein said delivering a laser beam comprises selecting said independently selectable locations during operation of a laser supplying said laser beam.

79. Thin film transistors on a substrate produced according to the method of claim 56.

80. Laser processing apparatus, comprising:

a holder configured to hold a first material in proximity to a second material; and

a laser beam delivery system operative to deliver a plurality of laser beams to independently selectable locations on said second material configured to induce a reaction between said first material and said second material at said independently selectable locations.

81. The apparatus claimed in claim 80, wherein said holder comprises a gas chamber configured to hold a solid substrate immersed in a gas.

82. The apparatus claimed in claim 81, wherein said solid substrate comprises silicon and said gas comprises a dopant.

83. The apparatus claimed in claim 82, wherein said silicon is deposited as a film on an insulating substrate.

84. The apparatus claimed in claim 83 and wherein said insulating substrate comprises glass.

85. The apparatus claimed in claim 82, wherein said locations correspond to locations whereat transistors are to be formed in said silicon.

86. The apparatus claimed in claim 80, wherein said holder is configured to shower ionized molecules onto a solid material.

87. The apparatus claimed in claim 86, wherein said solid material comprises silicon and said ionized molecules comprise a dopant.

88. The apparatus claimed in claim 87, wherein said silicon is deposited on an insulating substrate.

89. The apparatus claimed in claim 87, wherein said locations correspond to locations whereat transistors are to be formed in said silicon.

90. The apparatus claimed in claim 80, wherein said first material and said second material are solids.

91. The apparatus claimed in claim 90, wherein one of said solid materials comprises a dopant.

92. The apparatus claimed in claim 90, wherein one of said solid materials comprises an etching agent.

93. The apparatus claimed in claim 80, wherein said holder is operative to hold a solid material in contact with a liquid.

94. The apparatus claimed in claim 93, wherein said liquid comprises a dopant.

95. The apparatus claimed in claim 93, wherein said liquid comprises an etching agent.

96. The apparatus claimed in claim 80, wherein said laser beam delivery system comprises a beam splitter splitting a first laser beam into a plurality of sub-beams, said laser beam delivery system being operative to deliver said sub-beams to said mutually independently selectable locations.

97. The apparatus claimed in claim 80, wherein said laser beam delivery system comprises a scanner scanning a pulsed laser beam across a surface in synchronization with pulses defining said pulsed laser beam, thereby to deliver at least one pulse to a selectable location.

98. The apparatus claimed in claim 97, wherein said laser beam delivery system further comprises a modulator modulating said laser beam to deliver said pulses exclusively to said locations.

99. The apparatus claimed in claim 80, wherein said laser beam delivery system is operative to deliver said laser beam to said locations that are at least partially isolated from other said locations.

100. The apparatus claimed in claim 80, wherein said laser beam delivery system is operative to deliver said laser beam to said locations that vary from other said locations in size.

101. The apparatus claimed in claim 80, wherein said laser beam delivery system is operative to deliver said laser beam to said locations that vary from other said locations in spacing.

102. The apparatus claimed in claim 80, wherein said laser beam delivery system comprises a modulator modulating an energy characteristic of said laser beam.

103. The apparatus claimed in claim 102, wherein said laser beam delivery system is operative to deliver said laser beam with a first modulated energy characteristic to a first independently selectable location, and then to deliver said laser beam with a second modulated energy characteristic to a second independently selectable location.

104. The apparatus claimed in claim 80, wherein said laser beam delivery system comprises a pulsed laser outputting a pulsed laser beam having a pulse repetition rate of greater than 5 KHz.

105. The apparatus claimed in claim 80, said laser beam delivery system being operative to individually heat each of said selectable locations to at least partially melt said second material.

106. The apparatus claimed in claim 80, said laser beam delivery system including a steering device being configured to steer beams to different selectable locations during operation of a laser supplying said laser beam.

107. The apparatus claimed in claim 80, wherein said laser beam delivery system comprises a scanner scanning said laser beam and a modulator modulating said beam during scanning.

108. The apparatus claimed in claim 80, wherein said laser beam delivery system is configured to deliver said laser beam to said independently selectable locations without an intervening photo mask.

109. The apparatus claimed in claim 108, wherein said laser beam delivery system is operative to select said locations during operation of a laser supplying said laser beam.

110. Thin film transistors on a substrate produced according to the method of claim 80.

111. A method of producing thin film transistors on a substrate, comprising:

generating a laser beam;

splitting said laser beam into a plurality of selectably positionable sub-beams; and

directing each of said sub-beams to selectable areas on said substrate where said transistors are to be formed in the presence of a doping gas to induce a reaction between said substrate and said doping gas at said selectable areas.

112. The method according to claim 111, wherein each of said selectable areas is at least partially isolated from another one of said selectable areas.

113. The method according to claim 111, wherein at least one of said selectable areas vary from each other in size and spacing.

114. The method according to claim 111, wherein said laser beam is a pulsed laser beam having a pulse repetition rate of greater than 5 KHz.

115. The method according to claim 111, wherein said sub-beams are independently guided so as to interact with said doping gas and with said substrate surface, at each of said selectable areas.

116. The method according to claim 111, further comprising individually heating each of said selectable areas thereby forming bases of said transistors.

117. A thin film transistor formation system comprising:

a laser generating at least one laser beam;

a laser beam director directing said laser beams to selectable locations on a substrate in contact with a reactant,

wherein said laser beams are independently guided.

118. The thin film transistor formation system according to claim 117, further comprising beam shaping lens to vary shape of said beams.

119. The thin film transistor formation system according to claim 117, wherein said laser has a total average power of less than 50W.

120. The thin film transistor formation system according to claim 117 further comprising a beam splitter splitting said laser beam into a plurality of sub-beams and a reflector configured to independently guide said sub-beams to locations on said substrate, wherein said reflector comprises a plurality of micromirrors directionally controlling each of said sub-beams.

121. The thin film transistor formation system according to claim 120, wherein said sub-beams are focused by at least one focusing lens.

122. The thin film transistor formation system according to claim 117, further comprising:

a processing chamber where said substrate is to be treated with said at least one laser beam;

a gas supply unit configured to supply a gas containing said reactant to said processing chamber, said substrate to be immersed in said gas during treatment with said at least one laser beam; and

a gas purging unit purging gas from said processing chamber.

123. The thin film transistor formation system according to claim 122, wherein said gas reacts with said substrate when subject to said at least one laser beam at said selectable areas.

124. The thin film transistor formation system according to claim 117, further comprising a controller controlling at least one of a fluence property of said at least one laser beam, a pulse rate of said at least one laser beam and a quantity of pulses impinging said substrate.

125. The thin film transistor formation system according to claim 117, wherein said laser is a non-excimer pulsed laser.

126. A method of manufacturing an array of thin film transistors, comprising:

depositing amorphous silicon on a substrate;

crystallizing said amorphous silicon by applying laser energy to said amorphous silicon at a plurality of selectable locations;

applying P type doping to portions of crystallized silicon by delivering laser energy to a plurality of selectable locations in presence of a P type doping agent.

127. The method claimed in claim 126, wherein said applying P type doping comprises forming PMOS channels.

128. The method claimed in claim 126, further comprising:

applying N type doping to portions of crystallized silicon by delivering laser energy to said plurality of selectable locations in presence of an N type doping agent.

129. The method claimed in claim 128, wherein said applying N type doping comprises forming NMOS channels.

130. The method claimed in claim 127, further comprising:

applying N type doping to portions of crystallized silicon by delivering laser energy to said plurality of selectable locations in presence of an N type doping agent.

131. The method claimed in claim 130, wherein said applying N type doping comprises forming NMOS channels.

132. The method claimed in claim 131, further comprising forming dielectric gates.

133. The method claimed in claim 131, further comprising:

laser treating crystallized silicon at said selectable locations to hydrogenate said selectable locations.

134. The method claimed in claim 132, further comprising:

laser treating said selectable locations in said crystallized silicon in the presence of said P doping agent to form PMOS type source/drains.

135. The method claimed in claim 134, further comprising:

laser treating selected areas in said crystallized silicon in the presence of said N doping agent to form NMOS type source/drains.

136. The method claimed in claim 126, wherein at least one of dehydrogenating, crystallizing said silicon, doping and hydrogenating is performed without masking.

137. Thin film transistors on a substrate produced according to the method of claim 126.